

INFORMATION TECHNOLOGY (IT)

\$139,390,000
+27,030,000 / 24.1 %

NSF's FY 2023 Congressional Request for IT investments total \$139.39 million. Funding for NSF's IT investment is provided from the AOAM, R&RA, and EDU accounts.

NSF IT Portfolio Investments by Appropriation

NSF IT Portfolio Investments by Appropriation
(Dollars in Millions)

| | FY 2021 | | FY 2022 (TBD) | FY 2023 Request | Change over | | Funding Source |
|----------------------------------|-------------------|---------------|------------------|--------------------|-------------------|--------------|-------------------|
| | FY 2021 Actual | ARP Actual | | | FY 2021 Actual | Percent | |
| AOAM IT | \$24.27 | \$2.49 | - | \$30.67 | \$6.40 | 26.4% | AOAM |
| Program Related Technology (PRT) | 88.08 | - | - | 108.72 | 20.64 | 23.4% | R&RA/EHR |
| Total | \$112.36 | \$2.49 | - | \$139.39 | \$27.03 | 24.1% | |
| Total AOAM | 24.27 | 2.49 | - | 30.67 | 6.40 | 26.4% | |
| Total R&RA | 75.88 | - | - | 92.84 | 16.96 | 22.3% | |
| Total EDU | 12.20 | - | - | 15.88 | 3.68 | 30.2% | |

Agency IT investments funded through the AOAM account support the agency's operations to ensure high quality, reliable, and secure administrative applications and associated IT infrastructure support and services to meet the needs of the Foundation. This funding accounts for almost one quarter (22 percent) of NSF's total IT investment at the FY 2023 Request level.

Program Related Technology (PRT) investments support NSF's programmatic activities and associated services and are funded through the R&RA and EDU accounts. PRT investments are mission-related IT and data management investments that support the merit review process, including pre-award planning and activities; receipt of proposals; processing proposals; reviewing proposals; award decisions, documentation, and notification; funding awards; post-award oversight; dissemination of award results; and award close-out. PRT investments account for just over three quarters (78 percent) of NSF's FY 2023 total funding for IT investments.

NSF's IT priorities for FY 2023 are to preserve secure, reliable information technology operations, while continuing to deliver incremental modernization of the agency's IT infrastructure and systems that support the business operations of the agency. Advances supported by this submission include: additional automation and streamlining of work performed by NSF staff; implementing new business rules, workflows, and/or reporting needs as a result of business process and organizational changes as well as any Congressional oversight and transparency/stewardship requirements; updates to public and researcher facing systems and websites to respond to user experience input and increased interest in NSF's work; reducing administrative burden on our external partners; and changes to make additional data available to the public as well as university and corporate partners. NSF's IT investments will also focus on how technology can be used to augment and amplify human performance, a continued effort on implementing and scaling solutions that will further priorities stemming from continuing the agency's commitment to enterprise excellence. At the FY 2023 Request, incremental development and modernization efforts will continue based upon agency priorities, including:

- Technology transformations geared toward improving the customer experience both internally

- and for public-facing digital services, with a continued focus on modernization and digitization;
- Expand development and implementation of advanced technologies such as artificial intelligence (AI), robotic process automation (RPA), and advanced data analytics tools to support NSF’s mission;
- Employ innovative and emerging technology capabilities in support of agency priorities, increasing agility within NSF’s merit review and administrative functions while enabling the continued transformation of the agency’s workforce and providing platforms for development and testing of new technology tools and capabilities;
- Support for the IT infrastructure and systems that serve the agency, preserving secure, reliable operations while enabling risk-based prioritization of cybersecurity improvements, including continued focus on mitigating supply chain risk;
- Support the continued operation of iTRAK, the Foundation’s financial management system, and NSF’s Financial Services Support investment, distinct from the iTRAK investment, to ensure continued interoperability between NSF’s core financial functions; modernize NSF’s financial management functions; and increase transparency and accuracy of reporting between iTRAK and other mission systems;
- Support continued use and refinement of the Technology Business Management (TBM) framework for managing IT as a business.

NSF IT Portfolio Investments by Category

Investments in NSF’s IT Portfolio can be grouped across five main categories: Administrative Applications Services and Support; Mission-Related Applications and Services; IT Operations and Infrastructure; IT Security and Privacy; and IT Management. Funding for the activities under these investment categories is split between AOAM and PRT.

| | FY 2021 Actual | FY 2022 (TBD) | FY 2023 Request | Change over | | Funding Source |
|-----------------------------------------|-------------------|------------------|--------------------|--------------------------|--------------|-------------------|
| | | | | FY 2021 Actual Amount | Percent | |
| Admin. Applications Services & Support | \$7.18 | - | \$7.91 | \$0.73 | 10.1% | AOAM |
| Mission Related Applications & Services | 57.69 | - | 67.91 | 10.22 | 17.7% | PRT |
| IT Operations & Infrastructure | 39.72 | - | 49.58 | 9.86 | 24.8% | AOAM/PRT |
| Security & Privacy Services | 7.09 | - | 11.12 | 4.03 | 56.9% | AOAM/PRT |
| IT Management | 0.68 | - | 2.87 | 2.19 | 319.6% | AOAM/PRT |
| Total | \$112.36 | - | \$139.39 | \$27.03 | 24.1% | |

Administrative Applications Services and Support (\$7.91 million: AOAM only)

Investments in this category support administrative applications, such as the NSF website, NSF’s human resources management systems, and NSF’s financial management system.

- iTRAK is NSF’s financial management system. Seventy percent will be funded by PRT through the R&RA and EDU accounts and 30 percent will be funded by the AOAM account. The AOAM portion of the FY 2023 funding supports ongoing operations and maintenance of the system as well as updates and enhancements to support intragovernmental transactions.
- Other administrative applications services which provide for operations and maintenance of agency administrative and collaboration tools, such as the NSF website. FY 2023 funding in this area will support operations and maintenance of both NSF’s legacy website and beta.nsf.gov as the agency continues to transition site content.

- Operations and maintenance of the systems that support the strategic management of NSF human capital, including those that enable the effective recruitment, retention, reskilling, and rewarding of NSF staff. Funding in FY 2023 continues support for operations of the agency's core human capital management systems and invests in new capabilities and expanded services to accommodate the workforce.

Mission-Related Applications and Services (\$67.91 million: PRT only)

Investments in this category fund the applications and services that support the merit review process, including pre-proposal planning; receipt of proposals; processing proposals; reviewing proposals; award decisions, documentation, and notification; funding awards; post-award oversight; dissemination of award results; and award close-out. These investments can be classified as:

- Mission Support Systems, which include support for a wide range of activities:
 - Operations and maintenance of NSF's mission support systems, which provide a suite of functionality supporting each stage in the NSF proposal and award management process. Work in this area incorporates ongoing needs for new functionality as it is incrementally deployed for production use. In FY 2023, additional costs are expected in this area, as long-term investments in Proposal Management Efficiencies (PME) and Website Modernization move into production and will require operational support and maintenance.
 - Continuous modernization of systems and services that support the merit review process. FY 2023 efforts will continue to prioritize modernization of public-facing digital services. Specific investments include:
 - Web Modernization: Continues efforts to expand the capabilities and information shared through NSF's website, which provides the general public, science and engineering research communities, and education communities with access to high quality information and services. In FY 2023, NSF will continue enhancement of NSF.gov with features and content to better serve all audiences and will initiate modernization of the agency's intranet site using human centered design principles.
 - Public Access: Supports continued use of the NSF Public Access Repository (NSF-PAR) as a controlled platform for integration with third-party services, leveraging application programming interfaces that support machine-to-machine communication to enhance use and discovery and reduce burden on the research community. FY 2023 efforts continue system updates that enhance access to research outputs within the federated cross-agency repository.
 - Intelligent Automation of Grants Management Systems: This investment provides for enhancements to IT systems/applications that support the grants management lifecycle, including those formerly related to the PME investment. Investments aligned to this initiative in FY 2023 will focus on improvements to enhance non-financial aspects of the merit review process, including continued efforts related to identity management capabilities and services as well as beginning work to replace NSF's system that facilitates the clearance and publication of solicitations.
 - Improve Service Delivery: In FY 2023 this initiative will continue focusing on tools to enhance IT service delivery, such as strengthened infrastructure and tools that support hybrid work and improved collaboration.
 - Interactive Panel Systems (IPS) Replacement: A continuing modernization effort to replace the current interactive panel system, which provides reviewers an application for collaborating with fellow panelists to review and rank proposals and recommend the proposals deemed most meritorious. This effort is expected to be completed in FY 2023.

Information Technology

- Innovation Management: Continues the adoption and implementation of advanced tools and technologies to promote innovation, research and development, and emerging technologies in support of the renewed merit review process. Specifically, FY 2023 funding will continue efforts to consolidate, integrate, and streamline services through the expansion of advanced technology such as AI, RPA, and machine learning, reducing administrative burden on the user.
- PME: This investment will be completed in FY 2022 and will not require funding in FY 2023.
- NSF's Data Management and Delivery investment: NSF's IT governance groups have prioritized agency initiatives to strengthen the agency use of data and evidence. FY 2023 funding includes continued investments in infrastructure, services and systems that accelerate access to secured, timely, well-documented enterprise data, enabling agency staff to leverage data and analytics to achieve NSF's mission.
- Operations and maintenance of NSF's core financial system, iTRAK: As noted above 70 percent of this request is funded by PRT with the remaining 30 percent funded by AOAM under Administrative Applications Services and Support.
- Financial services support: Enables continued agency efforts to increase transparency and accuracy of reporting between iTRAK and other mission systems, such as through account code structure modernization and completion of Awards system modernization efforts. FY 2023 efforts will also focus on enhancements to core business and operations systems serving business professionals and awardees.
- Human Resource System Modernization: This is an ongoing investment that will modernize and enhance core agency systems for strategic management of human capital and administrative resource management. In FY 2023, NSF will prioritize enhancements to the agency's learning management system.

IT Operations and Infrastructure (\$49.58 million: \$17.95 million in AOAM, \$31.63 million in PRT)

The FY 2023 Starting Point will support NSF's ongoing enhancements to agency capabilities related to network, infrastructure, data center, customer support, and database administration. Specifically, the investments in this category are classified as:

- Network: Provides access to administrative applications, services, and technologies for virtual collaboration via a single network with wired and Wi-Fi connectivity for NSF staff and visitors. FY 2023 funding supports continuous modernization of NSF's infrastructure, network, and telecommunications, including costs associated with the agency's continued adoption of Internet Protocol Version 6 (IPv6) technologies, as well as voice services via NSF's modernized voice over internet protocol (VoIP) solution and other telecommunications requirements delivered through the federal Enterprise Infrastructure Services (EIS) contract.
- Data Center and Cloud: Continues the agency use of cloud services and technologies, including the use of cloud-based email and collaboration tools, to enable further reductions in NSF's data center footprint, as the agency continues to expand cloud services adoption. FY 2023 funding will support continued cloud migrations to increase resilience of IT services and applications, improve speed of deployment, and support NSF's service recovery capability. Support for Data Center Facilities and Power is not included in the AOAM IT or PRT budgets discussed in this narrative but is included in the agency's IT Portfolio summary reporting and mentioned here for transparency. Funding for Data Center Facilities and Power is supported under Space Rental and referenced in that section of the Administrative Support narrative.
- End User: Provides help desk services and customer care support for internal users (NSF staff) and external users (the research community including institutions, principal investigators, reviewers,

and NSF visitors), as well as support for agency-provided workstations, mobile devices, and peripherals. FY 2023 funding in this area supports continuing improvements to service delivery, including deployment of new technology capabilities to NSF staff and customers who are working remotely, as well as ongoing modernization of services and devices.

- Platform: Reflects NSF's use, management, and acquisition of hyper-converged hardware, software, and services. In FY 2023, NSF will continue efforts to modernize database platforms.
- Output: Supports NSF's Print Center services. These costs are not part of the AOAM IT or PRT budget discussed in this narrative but are included in the agency's IT Portfolio summary reporting and mentioned here for transparency. Funding for Print Center services are supported under Building and Administrative Services and discussed in that section of the Administrative Support narrative.

Security and Privacy Services (\$11.12 million: \$4.26 million in AOAM, \$6.86 million in PRT)

Investments in this category support the portion of NSF's IT security program which provides security and compliance oversight for NSF's administrative applications and mission support systems under the direction of the NSF Chief Information Security Officer (CISO). The FY 2023 level prioritizes preservation of secure, reliable operations, including the agency's Security Operations Center (SOC) capability providing 24/7/365 security monitoring, detection, and response capabilities and adds support for information technology operations and maintenance for a new Sensitive Compartmented Information Facility (SCIF) in the Alexandria facility. This funding level also enables NSF to continue current approaches to manage, modernize, and secure agency information, including efforts to manage supply chain risks, implement operational procedures related to cybersecurity vulnerability and incident response, and mature capabilities to protect agency information, endpoints, and enterprise identity management solutions. In FY 2023, NSF anticipates ongoing investments in staff, tools, and professional services to mitigate the increasing risks of a larger, hybrid workforce operating in a more complex and rapidly growing infrastructure environment, to continue providing secure, reliable operations and around-the clock security monitoring. The investment includes: offerings from the Department of Homeland Security (DHS) Continuous Diagnostics and Mitigation (CDM) shared services program, which provides NSF with security monitoring tools that supplement agency capabilities; automated configuration management tools that manage security patches and provide proactive protection from viruses, spyware, and other threats; application security; security control testing and tools; vulnerability management activities, including activities related to assessment, management, and disclosure; remediation and intrusion detection services; zero trust architecture; and activities related to cybersecurity assessment and authorization, including supply chain risk management.

IT Management (\$2.87 million: \$550,000 in AOAM, \$2.32 million in PRT)

IT Management includes support for the Chief Information Officer, Chief Data Officer, Senior Agency Official for Privacy, and senior IT leadership in the areas of IT strategy and planning, enterprise architecture, capital planning, vendor management, IT budget/finance, IT strategic communications, and support for policy and reporting efforts related to Federal IT, including compliance with the Federal Information Technology Acquisition Reform Act (FITARA). In FY 2023, investments in this category will enable NSF to continue implementation of the TBM framework, further enhancing the agency's ability to manage IT as a business.

Individual Directorate/Office IT Costs Outside of NSF's Central IT Budget

In an effort to increase transparency and show continuous improvement in NSF's reporting and understanding of its IT expenditures, NSF's Chief Information Officer continues to expand reporting of IT investments at NSF that are made outside of the central IT budget (AOAM IT and PRT) discussed above. Currently, NSF has identified about \$5.33 million of non-central IT costs that are being actively tracked and are included in the FY 2023 IT Portfolio summary reporting. These investments are coordinated through the Division of Information Systems (DIS) in OIRM—the organization that manages NSF's central IT budget—and are realized when other NSF divisions apply their funds (either R&RA, EDU, or AOAM account funds) onto DIS vendor labor contracts for various IT-related efforts.

NSF Funding for E-Government Initiatives

The tables below show NSF's contributions and service fees for various E-Government initiatives. These costs are not part of the AOAM IT or PRT budget discussed in this narrative but are included in the agency's IT Portfolio summary reporting and mentioned here for transparency. Both the FY 2022 and FY 2023 levels are consistent with the funding amounts provided by the initiatives' respective managing partners.

NSF FY 2022 Request Funding for E-Government Initiatives

| Initiative | FY 2022 | | | Appropriations Account | |
|------------------------------------------|----------------------|------------------|--------------------|------------------------|--------------------|
| | Agency Contributions | Agency Svc. Fees | NSF Total | AOAM | R&RA |
| Grants.gov | \$326,000 | - | \$326,000 | - | \$326,000 |
| Geospatial LoB | 25,000 | - | 25,000 | - | 25,000 |
| E-Rulemaking | - | 21,627 | 21,627 | 21,627 | - |
| USA Jobs | - | 10,399 | 10,399 | 10,399 | - |
| Integrated Acquisition Environment (IAE) | - | 719,644 | 719,644 | 21,000 | 698,644 |
| Human Resources Management LoB | 68,478 | - | 68,478 | - | 68,478 |
| Hiring Assessment LoB | 66,000 | - | 66,000 | - | 66,000 |
| Financial Management LoB | 139,094 | - | 139,094 | - | 139,094 |
| Budget Formulation/Execution LoB | 120,000 | - | 120,000 | - | 120,000 |
| Total | \$744,572 | \$751,670 | \$1,496,242 | \$53,026 | \$1,443,216 |

LoB: Line of Business

NSF FY 2023 Request Funding for E-Government Initiatives

| Initiative | FY 2023 | | | Appropriations Account | |
|------------------------------------|----------------------|------------------|--------------------|------------------------|--------------------|
| | Agency Contributions | Agency Svc. Fees | NSF Total | AOAM | R&RA |
| Grants.gov | \$325,000 | - | \$325,000 | - | \$325,000 |
| Geospatial LoB | 25,000 | - | 25,000 | - | 25,000 |
| E-Rulemaking | - | 23,474 | 23,474 | 23,474 | - |
| USA Jobs | - | 10,399 | 10,399 | 10,399 | - |
| Integrated Acquisition Environment | - | 719,644 | 719,644 | 21,000 | 698,644 |
| Human Resources Management LoB | 68,478 | - | 68,478 | - | 68,478 |
| Hiring Assessment LoB | 66,000 | - | 66,000 | - | 66,000 |
| Financial Management LoB | 139,094 | - | 139,094 | - | 139,094 |
| Budget Formulation/Execution LoB | 120,000 | - | 120,000 | - | 120,000 |
| Federal Executive Board | 100,000 | - | 100,000 | - | 100,000 |
| Total | \$843,572 | \$753,517 | \$1,597,089 | \$54,873 | \$1,542,216 |

LoB: Line of Business